

REMARKSI. Election of Claims

Claims 1, 11-12, 14 and 75-78 are currently pending. The amendments to the claims have been made in an effort to lend greater clarity to the claimed subject matter and to expedite prosecution. These amendments should not be taken to indicate the Applicant's agreement with, or acquiescence to the rejections of record.

II. Response to the Rejection of Claims 1, 11, 12, 14 and 75-78 under 35 USC 112, 1st and 2nd Paragraphs

The Applicant has amended independent claim 1 to remove the language "having substantially the same chemical composition but having different bandgaps."

The Applicant submits that support for the claimed features of the second sub-window p-type layer having a transparency than the first sub-window p-type layer, and a minimal mismatch between the bandgap of the first sub-window p-type layer and the absorber layer [i.e., the i-layer] is found in the specification at least at page 2, lines 17-18; at page 5, lines 16-17, and Figs. 4a-4b where it is shown that the first sub-p-layer is forms a good junction with the i-layer.

Further, remaining claims 11-12 and 14 depend from amended claim 1 and should be allowable for at least the same reasons as set forth above. Claim 77 had been amended to be in independent form and to reflect the language of claim 1. Further, claim 78 depends from amended claim 77 and should be allowable for at least the same reasons as set forth above.

Accordingly, Applicant requests withdrawal of the objections and the rejections of the claims under 35 U.S.C. §112, 2nd paragraph.

III. Response to the Rejection under 35 U.S.C. §102(b) of Claims 1-12, 75 and 76, as being anticipated by the new cited Ma et al. reference.

Claim 1 has been amended to recite that the first and second sub-window p-layers are comprised of one or more of thin film silicon based materials including at least one of amorphous silicon, protocrystalline silicon, nanocrystalline silicon, microcrystalline silicon, polycrystalline silicon (poly-Si:H), or other combinations and mixtures thereof; and that the second sub-window p-type layer has a transparency greater than the first sub-window p-type

layer. Support for such amendments is found in the specification and in the Figures.

There is no teaching in the Ma et al. reference of a variations between two sub p-layers with the sub p-layer adjacent to the absorber layer (i-layer).

In contrast, in the instant invention, the two sublayers provide a change in the bandgap of the sub p-layer adjacent to the i-layer so that the bandgap mismatch at the p-i interface is minimized. There is no teaching, suggestion or motivation in the Ma et al. reference of such feature.

In addition, there is no teaching in the Ma et al. reference where the first sub-window layer is formed by deposition at a first temperature, and the second sub-window is formed by deposition at a second temperature that is lower than the first temperature.

Further, remaining claims 11-12, 14, 75 and 76 depend from amended claim 1 and should be allowable for at least the same reasons as set forth above. Accordingly, Applicant requests withdrawal of the rejections of the claims under 35 U.S.C. §102(b).

IV. Response to the Rejection under 35 USC §103(a) of Claim 14 over the Ma et al. reference in view of the Sano et al. reference.

As fully set forth above, claim 1 now recites an embodiment where the first and second p-type sub-window layers have different transparencies and where there is a minimal mismatch between the bandgaps of the first sub-window layer and the absorber layer.

The Sano et al. reference relates to a device having an intermediate layer between the p- and TCO- interface and also relates a device having an interfacial layer at the p-i interface. The Sano et al. interfacial layer at p-i interface is present to improve the device open circuit voltage (Voc). Additionally, in the Sano et al. reference, the interfacial layer at the p-i interface is applied prior to the formation of i-layer. The benefit of such an interfacial layer is NOT on reducing the bandgap mismatching at the p-i interface but on the use of a thin layer to improve Voc.

In contrast, in the instant invention, the p-type layer (with two sub p-layers where the first sub p-layer adjacent to the i-layer reduces bandgap mismatch) improves the solar cell fill factor of the inventive device.

In addition, the claims 75-78 describe embodiments where the first sub-window layer is formed by deposition at a first temperature, and the second sub-window is formed by deposition at a second temperature that is lower than the first temperature; and where the sub p-layer adjacent to the i-layer is formed after the i-layer is formed. There is also no

teaching, suggestion or motivation in the Ma et al. or the Sano et al. et al. reference of such features.

Further, remaining claims 11-12 and 14 depend from amended claim 1 and should be allowable for at least the same reasons as set forth above.

Accordingly, Applicant requests withdrawal of the rejections of the claims under 35 U.S.C. §102(b).

V. Conclusion

None of the cited references addressed, let alone purported to solve, the problem of a mismatch between the bandgap of a p layer and an absorber layer, which problem is solved by the present invention. In view of the amendments to the claims, the Applicant submits that these claims are also in condition for allowance.

Applicant notes that no references were cited against claims 77 and 78. In view of the amendments to independent claim 77 to overcome the 35 USC 112, 1st and 2nd paragraph rejections, the Applicant submits that these claims are also in condition for allowance.

Accordingly, Applicant requests withdrawal of the rejections of the claims under 35 U.S.C. §§ 112, 102(b) and 103(a).

In view of the above amendments to the claims and the remarks herein, it is submitted that the specification, drawings and claims are in proper form. Accordingly, the Applicant respectfully request reconsideration and withdrawal of the objections and rejections of record, and allowance of all claims.

VI. Request for Telephone Interview

As a final matter, if the Examiner has any suggestions concerning different claim phraseology that, in the opinion of the Examiner, more accurately defines the present invention, prior to issuance of another Office Action, Applicant's attorney requests the courtesy of a telephone interview at the Examiner's earliest convenience to discuss the application. Applicant's attorney may be contacted at 419.255.5900.